REMARKS

Claims 1-20 are all the claims presently pending in the application. Claims 1, 8, and 16 are amended to more clearly define the invention. Claims 1, 8, and 16 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicant also notes that, notwithstanding any claim amendments herein or later during prosecution, Applicant's intent is to encompass equivalents of all claim elements.

Claims 1-4, 7, 14-15, 17, and 19-20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by the Spaeth reference. Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the Spaeth reference in view of the Nagai et al. reference. Claims 6, 8-19, 16, and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Spaeth reference in view of the Lowery et al. reference. Claims 10-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Spaeth reference in view of the Slater et al. reference.

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

An exemplary embodiment of the claimed invention as defined by, for example, independent claim 1, is directed to a light emitting apparatus that includes a semiconductor light emitting element including a substrate. Light radiates from a light emission surface of the substrate of the light emitting element. The light emission surface is provided on the substrate opposite to an electrode forming surface of the substrate. The apparatus also includes a transparent structure mounted on the light emission surface of the substrate. The transparent structure is optically connected with the light emission surface and has a light distribution characteristic based on a three-dimensional shape of the transparent structure. A p-electrode and an n-electrode are formed opposite to the light emission surface of the light emitting element.

Some conventional light emitting devices suffer from varying thicknesses of a phosphor coating that blocks the radiation of light, electrodes formed on a surface of the light emitting device that blocks the radiation of light, and wire bonding blocking the radiation of light.

The remaining conventional light emitting devices suffer from a complicated manufacturing process because of bump forming and the requisite need for high precision positioning, which requires the use of an expensive flip-chip bonding machine.

In stark contrast, an exemplary embodiment of the present invention provides a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode and an n-electrode formed opposite to the light emission surface of the light emitting element. In this manner, the light emitting apparatus may be easily connected to a lead frame, the manufacturing process may be simplified by obviating the need for bump forming, the light distribution density is lowered and, as a result a light distribution may be improved and the light blocking affects of a phosphor coating and/or wire bonds may be reduced. (Page 10, lines 10 – 29).

II. THE PRIOR ART REJECTIONS

A. The Spaeth reference

Regarding the rejection of claims 1-4, 7, 14-15, 17, and 19-20, the Examiner alleges that the Spaeth reference teaches the claimed invention. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by the Spaeth reference.

None of the applied references teaches or suggests the features of the claimed invention including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode and an n-electrode formed opposite to the light emission surface of the light emitting element. As explained above, these features are important for simplifying the manufacturing process while simultaneously improving the light distribution density and reducing the light that is blocked from the semiconductor light emitting element.

Rather, the Spaeth reference discloses a semi-conductor chip 2 having a p-electrode 12 (p-doped anode layer 5 contacts the thin contacts 12) on an electrode forming surface that is on the same side as the light emission surface. The "p-doped anode layer 5 [is] assigned to the light exit side of the light emitting diode." (col. 5, lines 51-52). The p-electrode 12 for the semi-conductor chip 2 of the Spaeth reference is clearly not on a surface that is opposite to the light emission surface.

Since the semiconductor chip 2 of the Spaeth reference includes electrodes on the

light emission side, the Spaeth reference very clearly suffers from the problems that are solved by the present invention. The electrodes 12 that are formed on the light emission side very clearly block the radiation of light.

In stark contrast, the present invention provides an electrode forming surface that is opposite to the light emission surface and a transparent structure that is mounted on the light emission surface. In this manner, the present invention provides a light emitting apparatus that may be easily connected to a lead frame, the manufacturing process may be simplified by obviating the need for bump forming, the light distribution density is lowered and, as a result a light distribution may be improved and the light blocking affects of a phosphor coating and/or wire bonds may be reduced.

Clearly, the Spaeth reference does not teach or suggest including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode and an n-electrode formed opposite to the light emission surface of the light emitting element.

Therefore, the Examiner is respectfully requested to withdraw this rejection of claims 1-4, 7, 14-15, 17, and 19-20.

B. The Spaeth reference in view of the Nagai et al. reference

Regarding the rejection of claim 5, the Examiner alleges that the Nagai et al. reference would have been combined with the Spaeth et al. reference to form the claimed invention. Applicant submits, however, that these references would not have been combined and, even if combined, the combination would not teach or suggest each and every element of the claimed invention.

None of the applied references teaches or suggests the features of the claimed invention including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode and an n-electrode formed opposite to the light emission surface of the light emitting element. These features are important for simplifying the manufacturing process while simultaneously improving the light distribution density and reducing the light that is blocked from the semiconductor light emitting element.

As explained above, the Spaeth reference very clearly does not teach or suggest these features.

The Nagai et al. reference does not remedy the deficiencies of the Spaeth reference.

Indeed, the Examiner does not allege that the Nagai et al. reference teaches or suggests including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode on the electrode forming surface that is opposite to the light emission surface.

Moreover, like the Spaeth reference, the light emitting device that is disclosed by the Nagai et al. reference suffers from the very same problems that are solved by the present invention. The semiconductor chip 3 that is disclosed by the Nagai et al. reference includes electrodes on the light emission surface. These electrodes very clearly block the radiation of light from the light emission surface.

In stark contrast, the present invention provides an electrode forming surface that is opposite to the light emission surface and a transparent structure that is mounted on the light emission surface. In this manner, the present invention provides a light emitting apparatus that may be easily connected to a lead frame, the manufacturing process may be simplified by obviating the need for bump forming, the light distribution density is lowered and, as a result a light distribution may be improved and the light blocking affects of a phosphor coating and/or wire bonds may be reduced.

Clearly, the Nagai et al. reference does not teach or suggest including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode and an n-electrode formed opposite to the light emission surface of the light emitting element.

Further, contrary to the Examiner's allegations, one of ordinary skill in the art would not have been motivated to combine these references.

Specifically, the Spaeth reference is concerned with the problem of overcoming the limits of miniaturization of light emitting diode housings which are made from extrusion coated conductor bands or injection molded plastic because of the mechanical and thermal stability required of the components. (Col. 1, lines 33 – 39).

In stark contrast, the Nagai et al. reference is concerned with the completely different and unrelated problem of reducing display contrast degradation for displays using a plurality of light emitting diodes ([0011] – [0018]).

One of ordinary skill in the art who was concerned with the problem of overcoming the limits of miniaturization of light emitting diode housings which are made from extrusion

coated conductor bands or injection molded plastic because of the mechanical and thermal stability required of the components as the Spaeth reference is concerned with addressing would not have referred to the Nagai et al. reference because the Nagai et al. reference is concerned with the completely different and unrelated problem of reducing display contrast degradation for displays using a plurality of light emitting diodes. Thus, these references would not have been combined.

Therefore, the Examiner is respectfully requested to withdraw the rejection of claim 5.

C. The Spaeth reference in view of the Lowery et al. reference

Regarding the rejection of claims 6, 8-9, 16, and 18, the Examiner alleges that the Lowery et al. reference would have been combined with the Spaeth et al. reference to form the claimed invention. Applicant submits, however, that these references would not have been combined and, even if combined, the combination would not teach or suggest each and every element of the claimed invention.

None of the applied references teaches or suggests the features of the claimed invention including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode and an n-electrode formed opposite to the light emission surface of the light emitting element. These features are important for simplifying the manufacturing process while simultaneously improving the light distribution density and reducing the light that is blocked from the semiconductor light emitting element.

As explained above, the Spaeth reference very clearly does not teach or suggest these features.

The Lowery et al. reference does not remedy the deficiencies of the Spaeth reference.

Indeed, the Examiner does not allege that the Lowery et al. reference teaches or suggests including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode on the electrode forming surface that is opposite to the light emission surface.

Moreover, like the Spaeth reference, the light emitting device that is disclosed by the Lowery et al. reference suffers from the very same problems that are solved by the present invention. The semiconductor chip 12 that is disclosed by the Lowery et al. reference includes electrodes on the light emission surface. These electrodes very clearly block the

radiation of light from the light emission surface.

In stark contrast, the present invention provides an electrode forming surface that is opposite to the light emission surface and a transparent structure that is mounted on the light emission surface. In this manner, the present invention provides a light emitting apparatus that may be easily connected to a lead frame, the manufacturing process may be simplified by obviating the need for bump forming, the light distribution density is lowered and, as a result a light distribution may be improved and the light blocking affects of a phosphor coating and/or wire bonds may be reduced.

Clearly, the Lowery et al. reference does not teach or suggest including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode and an n-electrode formed opposite to the light emission surface of the light emitting element.

Further, contrary to the Examiner's allegations, one of ordinary skill in the art would not have been motivated to combine these references.

Specifically, the Spaeth reference is concerned with the problem overcoming the limits of miniaturization of light emitting diode housings which are made from extrusion coated conductor bands or injection molded plastic because of the mechanical and thermal stability required of the components. (Col. 1, lines 33 – 39).

In stark contrast, the Lowery et al. reference is concerned with the completely different and unrelated problem of providing a phosphor light emitting diode that can generate output light having a well-balanced color characteristic for a true color rendition. (Col. 2, lines 33-37).

One of ordinary skill in the art who was concerned with the problem of overcoming the limits of miniaturization of light emitting diode housings which are made from extrusion coated conductor bands or injection molded plastic because of the mechanical and thermal stability required of the components as the Spaeth reference is concerned with addressing would not have referred to the Lowery et al. reference because the Lowery et al. reference is concerned with the completely different and unrelated problem of providing a phosphor light emitting diode that can generate output light having a well-balanced color characteristic for a true color rendition. Thus, these references would not have been combined.

Therefore, the Examiner is respectfully requested to withdraw the rejection of claims 6, 8-9, 16, and 18.

D. The Spaeth reference in view of the Slater et al. reference

Regarding the rejection of claims 10-13, the Examiner alleges that the Slater et al. reference would have been combined with the Spaeth et al. reference to form the claimed invention. Applicant submits, however, that these references would not have been combined and, even if combined, the combination would not teach or suggest each and every element of the claimed invention.

None of the applied references teaches or suggests the features of the claimed invention including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode and an n-electrode formed opposite to the light emission surface of the light emitting element. These features are important for simplifying the manufacturing process while simultaneously improving the light distribution density and reducing the light that is blocked from the semiconductor light emitting element.

As explained above, the Spaeth reference very clearly does not teach or suggest these features.

The Slater et al. reference does not remedy the deficiencies of the Spaeth reference.

Indeed, the Examiner does not allege that the Slater et al. reference teaches or suggests including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode on the electrode forming surface that is opposite to the light emission surface.

Clearly, the Slater et al. reference does not teach or suggest including a transparent structure that is mounted on the light emission surface of the substrate of a semiconductor light emitting element and a p-electrode and an n-electrode formed opposite to the light emission surface of the light emitting element.

Further, contrary to the Examiner's allegations, one of ordinary skill in the art would not have been motivated to combine these references.

Specifically, the Spaeth reference is concerned with the problem overcoming the limits of miniaturization of light emitting diode housings which are made from extrusion coated conductor bands or injection molded plastic because of the mechanical and thermal stability required of the components. (Col. 1, lines 33 – 39).

In stark contrast, the Slater et al. reference is concerned with the completely different

and unrelated problem of providing an improved light extraction technique for light emitting diodes. (Col. 3, lines 33-39).

One of ordinary skill in the art who was concerned with the problem of overcoming the limits of miniaturization of light emitting diode housings which are made from extrusion coated conductor bands or injection molded plastic because of the mechanical and thermal stability required of the components as the Spaeth reference is concerned with addressing would not have referred to the Slater et al. reference because the Slater et al. reference is concerned with the completely different and unrelated problem of providing an improved light extraction technique for light emitting diodes. Thus, these references would not have been combined.

Therefore, the Examiner is respectfully requested to withdraw the rejection of claims 10-13.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that claims 1-20, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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